

TO: Iowa Newspaper Association Member Editors  
FROM: Iowa Department of Economic Development  
DATE: January 22, 2007  
RE: "Iowa Innovators"

The "Iowa Innovators" series is a joint project of the Iowa Newspaper Association and the Iowa Department of Economic Development (IDED). The series is an outgrowth of an idea from member INA publishers. "Iowa Innovators" articles describe initiatives that Iowa communities have used to improve their ability to attract business and industry and demonstrate community innovation. The articles also describe Iowa companies on the leading edge of technology, business expansion, workforce development and recycling.

It is hoped that these article ideas can be published locally and spark community and business initiatives statewide. If you have community or business success stories to share, contact IDED, 200 East Grand Ave., Des Moines, IA 50309, 800.245.IOWA (4692) or email: [business@iowalifechanging.com](mailto:business@iowalifechanging.com).

The following is a list of companies and communities featured in this round of "Iowa Innovators" articles:

1. Surrounded by acre after acre of corn fields, two massive facilities will soon add value to nearly 150 million bushels of the grain annually. The ripple effect from the facilities will be felt by local farmers in the form of higher grain prices, and in the local economy in the form of 150 new jobs. Ultimately it will also benefit paper mills throughout the U.S. **The west-central Iowa community of Fort Dodge** is home to the two projects: the **VeraSun** ethanol plant that began operation in fall 2005 and **Tate & Lyle's \$260-million industrial starch and ethanol plant** currently under construction. When the Tate & Lyle facility is completed in spring 2009, it will create 110 new full-time jobs paying an average wage of \$24 per hour.
2. In the west-central **Iowa community of Pocahontas** three entrepreneurs have developed another use for corn—Iowa's most abundant natural resource. Their company, **S.A.R. Biomass Energy Systems**, has developed highly efficient furnaces that utilize corn as the fuel to heat homes and businesses. Jason Raveling, SAR co-owner, is bullish on the company's prospects. "Even at higher corn prices, our furnaces are much more efficient than traditional natural gas- or propane-fired furnaces," he says. "The cost per BTU of burning corn is still less than other heating sources. For example, one bushel of corn can heat the same amount of space that it takes 5.1 gallons at \$1.35 per gallon of LP to heat," says Raveling.
3. Ethanol, the clean-burning, high-octane fuel distilled from Iowa's corn fields, has the possibility to free the U.S. from its foreign oil dependence. Transforming corn into ethanol, however, takes energy, usually in the form of natural gas or coal. **Ames-based Frontline BioEnergy** is developing methods of converting biomass into energy, reducing an ethanol plant's consumption of fossil fuels, making ethanol an even greener product. As Iowa's ethanol industry continues to grow, developing energy from biomass could result in huge savings for the state's facilities. The Iowa Renewable Fuels Association says that at the end of 2006 Iowa had 28 ethanol plants capable of annually producing more than 1.8 billion gallons of the corn-based fuel as well as eight biodiesel facilities with an annual capacity of 136 million gallons.

## Corn Fuels Fort Dodge Growth

Surrounded by acre after acre of Iowa's greatest renewable resource—corn, two massive facilities will soon add value to nearly 150 million bushels of the grain annually.

The ripple effect from the two facilities will be felt by local farmers in the form of higher grain prices and in the local economy in the form of 150 new jobs. Ultimately it will also benefit paper mills throughout the U.S.

The west-central community of Fort Dodge is home to the two projects: the VeraSun ethanol plant that began operation in fall 2005 and Tate & Lyle's \$260-million industrial starch and ethanol plant currently under construction.

When the Tate & Lyle facility is completed in spring 2009 it will create 110 new full-time jobs paying an average wage of \$24 per hour.

Chris Olsen, director of community and governmental relations for Tate & Lyle, says the London-based company is a industry leader in cereal sweeteners and starches, sugar refining, value-added food and industrial ingredients.

"We are the world's leading producer of industrial starches and the sole manufacturer of the sugar substitute SPLENDA® Sucralose," says Olsen.

As corporate officials gathered for the official ground breaking ceremony last fall, Iain Ferguson Tate & Lyle CEO, said "this marks the beginning of a bright future for both the company and Fort Dodge as we move closer to our main ingredient.

"This investment will double our ethanol capacity, producing environmental and energy-saving benefits in the U.S. while reducing America's foreign oil dependence," he continued. "This is an important strategic move into the western Corn Belt."

Along with ethanol, the facility will produce cationic starches for the paper industry.

"Cationic starches are used to improve the internal bond and tensile strength during the paper-making process," says Olsen.

While Tate & Lyle looked at sites throughout the western Corn Belt, Olsen said Fort Dodge was selected "due to its local corn supplies, two railroads, available and skilled workforce and cooperation from local and state officials."

Leveraging the plant—the single largest business investment in Webster County's history, according to John Kramer, executive director of Webster County Economic Development—was a series of awards from Iowa Department of Economic Development programs.

They include a \$1 million award from the Community Economic Betterment Account (CEBA), and \$300,000 from the Value-Added Agricultural Products and Processes Financial Assistance Program (VAAPFAP), along with tax incentives and road improvements from Webster County.

"This is truly a world-class company that has leadership positions in every market they compete in," says Kramer.

"We couldn't be more excited to become a part of their global success."

Olsen says the corn wet-milling facility

will employ state-of-the-art technologies that makes processing corn more efficient and will lower the costs of a variety of products. "We will be using this facility to build upon our renewable food and industrial ingredients business," says Olsen.

Kramer is excited about both the near- and long-term benefits of the plant. "We estimate building the plant will create more than 400 construction jobs over 24 months," he says.

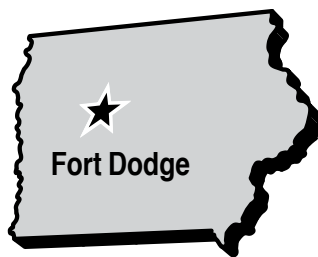
When completed, the plant's workforce will include management, production, laboratory, quality control and maintenance personnel.

As the nation continues its pursuit of energy independence, Iowa facilities such as VeraSun and Tate & Lyle are leading the way.

"In today's environment, we have to look increasingly at bio-based solutions as a way to reduce our dependence on finite resources such as coal and oil," says Ferguson.

"Tate & Lyle believes the corn fields of today will be the oil fields of the future. So what better place to build but here in Iowa."

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## Heating Up in Pocahontas

The gold rush to extract evermore value from a kernel of corn continues unabated in Iowa. From ethanol to natural vitamin E to cyclodextrins, biotechnology companies are using state-of-the-art processes to create more products from corn.

In the western Iowa community of Pocahontas three entrepreneurs have developed another use for Iowa's most abundant natural resource. Their company, S.A.R. Biomass Energy Systems has developed highly efficient furnaces that utilize corn as the fuel to heat homes and businesses.

And while rising corn prices have tempered early market acceptance of SAR furnaces over the past few months, Jason Raveling, SAR co-owner, is bullish on the company's prospects.

"Even at higher corn prices, our furnaces are much more efficient than traditional natural gas- or propane-fired furnaces," he says. "The cost per BTU of burning corn is still less than other heating sources."

"For example, one bushel of corn can heat the same amount of space that it takes 5.1 gallons at \$1.35 per gallon of LP to heat," says Raveling. "And this is before we take into account the efficiencies of our furnace."

Corn in SAR furnaces, he says, burns so hot it becomes a slag or molten liquid. That inch of liquid on top of the burning corn becomes the furnace's recognition source or pilot light.

The patent-pending furnace also has a larger heat exchanger than traditional furnaces, and the forced-air models are thermostatically controlled.

"Even with the higher corn prices, the savings one gets from burning corn allows customers to pay for the unit in four or five years," notes Raveling.

The 14-employee SAR is in the midst of building an additional 10,000 square feet of manufacturing space to produce its commercial and residential furnaces.

The expansion was aided by a series of tax credits and benefits from the Iowa Department of Economic Development-administered Enterprise Zone program.

SAR, now in its third year of operation, currently has 36 dealers in eight states. Raveling estimates that of the

nearly 1,000 units in operation, 50 percent have been installed on farms.

The company has also just finished a second trial-run of a corn-fueled grain dryer.

"We took our commercial furnace design and enlarged it to create the grain dryer," says Raveling.

"During several years of trial and error, we've developed a model that is efficient even at low temperatures and can run for upwards of 12 hours without oversight," says Raveling.

High moisture levels can make corn rot, which is why farmers use dryers to decrease moisture content and ensure storage longevity.

"Quite a few farmers are intrigued by the fact that they can grow their own fuel and not have

to rely on an imported source of energy," he says.

Raveling, who owns SAR along with Theron Anderson and Randy Severson, estimates that drying 5,500 bushels of corn would cost \$250 using corn as fuel compared to \$740 using LP. "And what little ash byproduct that's left from burning corn can be used as a fertilizer for growing new crops," notes Raveling.

Because heat produced from burning corn is such a dry heat, the 500,000 BTU SAR furnace is also receiving a lot of interest from owners of greenhouses and farmers who raise livestock.

"The dry heat from a SAR furnace takes moisture out of greenhouses, and hog, turkey and chicken buildings," says Raveling. "Low humidity environments are what greenhouses and livestock producers are looking for in their buildings."

By introducing a truly efficient heating system that utilizes a renewable, cost-effective resource, SAR Biomass Energy is providing an alternative to consumers wanting a home-grown energy source.

And as each unit leaves its Pocahontas assembly line, an Iowa company is helping the U.S. wean itself from foreign energy sources and find another use for corn.

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## On the Frontline of Biomass Energy

Ethanol, the clean-burning, high-octane fuel distilled from Iowa's corn fields, has the potential to free the U.S. from its foreign oil dependence.

Transforming corn into ethanol, however, takes energy, usually in the form of natural gas or coal.

Ames-based Frontline BioEnergy is developing biomass-to-energy conversion methods that reduce an ethanol plant's consumption of fossil fuels, making ethanol an even greener product.

As Iowa's ethanol industry continues to grow, developing energy from biomass could result in huge savings for the state's production facilities.

The Iowa Renewable Fuels Association says that at the end of 2006, Iowa had 28 ethanol plants capable of annually producing more than 1.8 billion gallons of the corn-based fuel as well as eight biodiesel facilities with an annual capacity of 136 million gallons.

"Using biomass to fuel an ethanol plant can reduce costs in making ethanol. It also hedges against volatility in the natural gas market and doubles the renewable energy ratio of the ethanol product," says Jerrod Smeenk, Frontline engineering and production manager.

Smeenk says natural gas accounts for one third of the cost of producing ethanol, the second-largest expense after corn. Ethanol production takes energy because it requires steam to mix cornstarch and water into a smooth mixture. It also takes energy to heat the mixture to an ideal temperature in order to ferment corn sugars into alcohol.

"It also takes energy to dry the remaining distillers grain to extend its shelf life until eaten by livestock," says Smeenk. Distillers grain is a nutrient-rich, high-protein meal left over from the ethanol process and is an excellent feed ration for dairy, cattle and poultry.

Frontline's technology involves partial combustion of biomass—waste wood, corn stalks, grasses and other biological material—to produce flammable gasses.

"This flammable gas can replace natural gas in an ethanol plant, lowering its operating costs and keeping energy dollars in the local economy," says Smeenk.

Frontline is currently constructing a pilot-scale gasification plant at Chippewa Valley Ethanol in Benson, Minnesota.

"We will be installing a fuel flexible system that will gasify biomass into combustible gas," says Smeenk. "The system will also condition the com-

combustible gas so it can be used to produce steam and dry distillers grain."

The system will give Chippewa Valley the ability to utilize biomass but also switch back to coal or natural gas if the

gasification system goes offline.

The \$15 million prototype gasifier will convert several biomass feedstocks including corn stover, wood wastes and even distillers dried grains.

The nine-employee Frontline moved to Ames from Colorado in early 2006 to be closer to producer customers for its new biomass technologies.

Assisting its move was a \$60,000 award from the Value-Added Agricultural Products and Processes Financial Assistance Program (VAAPFAP), administered by the Iowa Department of Economic Development.

The company is also working closely with Iowa State University to design commercial-scale gasifiers that could process more than 300 tons of biomass per day. Smeenk says that while the USDA estimates a potential annual supply of 1.4 billion tons of biomass, there are challenges in using biomass as an energy source.

"There's the issues of collection, transportation, storage and end processing of the biomass," says Smeenk.

"But every step we take in developing energy from biomass is another step away from our dependence on foreign and fossil energy sources."

Frontline BioEnergy, an Ames start-up company is working to make Iowa's ethanol industry more environmentally friendly. By finding new ways to convert biomass into energy, Frontline can give ethanol producers an additional energy source as it produces an alternative to fossil fuels.

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